

MEDICINE LAKE NATIONAL WILDLIFE REFUGE

MEDICINE LAKE, MONTANA

ANNUAL WATER PROGRAM - 1964 *for 1965*

UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

MEDICINE LAKE NATIONAL WILDLIFE REFUGE
MEDICINE LAKE, MONTANA

ANNUAL WATER PROGRAM - 1964

1. Source of Supply

Spring run-off water entering the refuge through Lake, Cottonwood, and Sand Creeks was the entire supply of water for our No. 12, 11, 10, and 9 impoundments and Katy's Lake during the 1964 season. Water in surplus to the amount required to maintain operational levels in these units was turned into Medicine Lake through structure 9F.

Big Muddy Creek, an intermittent drainage flowing south out of Canada, provided the bulk of water stored in Medicine Lake this year. This too was all spring run-off water.

Water diverted past control structure No. 1 on the Big Muddy Creek together with that flowing out of Wolf Creek and Saurkraut Coulee, drainages lying to the northwest of the Homestead Unit, supplied the bulk of the water used in the Homestead Lake this season. This was all spring run-off water.

Lost and Sheep Creeks drain the watersheds lying south and east of the Homestead Unit into Homestead Lake. Sheep Creek flowed briefly during the spring run-off but Lost Creek produced no water until the 3" rain storm in mid-July, then flowed about 1,000 A.F. into the lake in two days.

2. Type of Rights

The Bureau of Sport Fisheries and Wildlife holds Appropriative Water Rights on five drainages through filings posted and recorded in 1936 and 1937. These water rights are summarized below.

Water Rights Filing No.	Source	Amount of Water Right C.F.S.	Acres under Water Right
233163	Cottonwood Creek	100	3,640
233164	Sand Creek	75	3,640
233165	Lost Creek	25	840
233166	Sheep Creek	20	750
233167	Lake Creek	100	3,640
233168	Big Muddy Creek	50	1,600 Homestead Lake
233169	Big Muddy Creek	1,200	2,000 Medicine Lake

Refuge water use records extend back to June 1936.

3. Purpose of Use

During the 1964 season all appropriated waters were used for flood control, water conservancy as provided in the "Federal Migratory Bird Conservation Act", for irrigation of the marshes to produce wildlife food and habitat, as a disease reduction tool, and in storage to satisfy late season water demands of the above.

4. Season of Use

Water usage on the refuge is on a year-round basis with the heaviest usage occurring during the ice-free period of March through November. Most of the water used this year was received during the early spring period and only slight amounts resulted from summer rains.

5. Quantity Used

The quantity of water used varies considerably from year to year and is usually limited to the amount available from the spring run-off. All refuge water units were filled to or above operational level by the 1964 spring run-off, as the season progressed however, the refuge received little water from the light summer rains. All impoundment water levels were gradually lowered by transpiration, evaporation and seepage. A detailed report on the 1964 water usage was reported on Form 1 Hyd-F-103.0 and is summarized in the following Water Use Chart.

1964 WATER USE

Source	Water Right Area of Use	Vol. in A/F
Lake Creek	233167 Katy's Lake, Nos. 12,11,10 & 9 water areas & Medicine Lake	Est. 440
Cottonwood Creek	233163 Nos. 11,10, & 9 water areas & Medicine Lake	Est. 720
Sand Creek	233164 Nos. 10, & 9 Water areas & Medicine Lake	Est. 320
Big Muddy Creek	233169 Medicine Lake	Est. 16,760
Big Muddy Creek	233168 Homestead Lake	Est. 5,080
Lost Creek	233165 Homestead Lake	Est. 1,080
Sheep Creek	233166 Homestead Lake	Est. 600
Total		25,000 A/F
Released from Medicine Lake	Homestead Lake	Est. 3,240
Released from Homestead Lake	Waste	Est. 3,140
Released from Medicine Lake	Waste	Est. 5,220

6. Place of Use

The "1964 Water Use Chart" also lists the place of use of appropriated waters for the 1964 season and the approximate amount used in each area. An estimated 4,600 acre feet of water was flushed through the Homestead Lake early in the season in an attempt to relieve the severity of the botulism outbreak normally encountered in the lake each summer.

A one foot drawdown of Homestead Lake below operational level was approved by Regional Office and completed by July 15, 1964. This too was for botulism control.

Medicine Lake was drawn down 0.60' below operational level early in the spring to facilitate construction in the lake's spill area. This draw-down was made to prevent high winds from pushing water into the construction area.

An unauthorized opening of the Gaffney Pass structure in early August caused an 18" drawdown of water units 9 and 10. The structure locking mechanism was vandalized by persons unknown and the structure opened allowing water to pass from Gaffney Lake into Medicine Lake.

The estimated water use in each refuge unit for the years of 1960-1964 is presented in the following comparison chart.

Acre Feet of Water Reported Used on Refuge.

Impoundment	1960	1961	1962	1963	1964
Medicine Lake	27,000	8,350	14,790	17,748	10,962
Homestead Lake	9,700	700	3,392	9,689	9,900
No. 10 Water Unit	1,300	1,000	1,859	924	1,430
No. 11 Water Unit	600	250	1,094	224	710
No. 12 Water Unit	700	300	1,389	347	508
Katy's Lake	700	0	640	237	243
Total	40,000	10,600	23,164	29,169	23,753

The above chart can be used to represent a trend in the amount of spring run-off. It is inaccurate in that only gauge levels attained are considered with no indications as to the amount of water spilled or transferred from one unit to another. The new method of measuring the flow of water into the refuge throughout the season will be more accurate and future comparisons of refuge water usage will be based on those measurements.

7. Adequacy of Supply

All of our waters are derived from run-off. We were adequately supplied

see
use of flows
+ not just
fill volumes.

with water during the early spring period of 1964 but our supply was inadequate to maintain operational levels throughout the season; this is normal. With the advent of the dry summer, our water supply diminished and by June 1 most impoundments had begun to lower. Except for the "shot in the arm" received by the Homestead Lake in July, there was no renewal of refuge waters throughout the summer and fall and all units were below operational level at the end of the water season.

The following chart lists the monthly water levels in all units for the 1964 season:

Monthly Record of Guage Readings - 1964

IMPOUNDMENT	No. 4*	No. 6*	Katy's Lake	No. 10	No. 11	No. 12
PRESENT OPER. LEVEL	1943.00	1937.65	1954.00	1945.00	1951.54	1954.00
January	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen
February	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen
March	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen
April	1942.44	1937.31	1953.60	1946.01	1952.44	1953.71
May	1943.30	1937.65	1954.20	1945.49	1951.76	1954.06
June	1942.40	1937.65	1954.20	1945.49	1951.50	1953.88
July	1942.40	1937.15	1954.20	1945.09	1951.50	1954.00
August	1941.98	1936.55	1953.70	1943.59	1950.96	1953.34
September	1941.60	1936.15	1953.18	1943.56	1950.57	1952.83
October	1941.18	1936.50	1952.60	1943.50	1950.32	1952.50
November	1941.04	1936.25	1952.20	1943.47	1950.22	1952.36
December	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen

All guage readings as of the first of each month.

* No. 4 - Medicine Lake

* No. 6 - Homestead Lake

Deficiencies in each water unit at winter freeze-up time during the years 1960 to 1964 are compared in the following chart and will indicate the trend in late summer and fall water levels. The figures are not to be considered accurate as the refuge has no way of determining ^{exactly} how much water is contained in the various impoundments at given water elevations.

Impoundment	Deficiency in Acre Feet as of December				
	1960	1961	1962	1963	1964
Medicine Lake	8,352	14,790	8,352	8,352	17,000
Homestead Lake	442	2,112	1,818	1,600	1,800
No. 10 Water Area	2,123	1,859	671	319	1,700
No. 11 Water Area	653	493	230	102	400
No. 12 Water Area	372	1,383	335	471	1,000
Katy's Lake	Full	320*	262	224	600
Total	11,942	20,957	11,168	11,068	22,500

* Reported as "below guage".

An estimated 8,600 acre feet of water were released downstream from the refuge this season. However, 4,600 acre feet of this water had been flushed through the Homestead Lake and therefore should be considered as used by the refuge.

The amount of water available but not used varies greatly from one year to another and is primarily dependent on the rate and amount of run-off from the winters accumulation of snow and ice and summer cloud bursts. Run-off from the summer rains is usually of secondary importance though occasionally it does produce heavy amounts of water. The water that is in excess to our impoundment capacities must be turned on down the Lake Creek or Muddy Creek as the case may be.

8. Recommendations for 1965.

There is nothing to indicate that we will encounter undue difficulties in filling all units to operational level in the spring of 1965. Some 23,000 acre feet will be required for this purpose and we can expect to receive about 25,000 acre feet from an average spring run-off.

I offer the following suggestions for manipulation of water on the refuge during the 1965 season.

1. All present operational levels to be continued for 1965.
2. All operational levels be attained as early in the year as possible and - with the exception of Homestead Lake - all levels to be maintained as long as the water supply allows.

3. Maintain the present operational level of 1937.65' in the Homestead Lake during the early season but reduce that level 1.5' to the 1936.15' elevation by July 1 to continue the experiments on the control of botulism in that unit. The lower level should be maintained through to freeze-up time to facilitate marsh management work during the winter period.

4. Water in excess to that needed to maintain operational levels of all other units should be flushed through the Homestead Lake to assist in the removal of botulism causitive agents from that unit.

5. The following water use priority is suggested.

<u>Unit</u>	<u>Main Purpose</u>	<u>Priority</u>
No. 12 Water Unit	Nesting and rearing	1
Katy's Lake	Nesting and rearing	1
No. 11 Water Unit	Nesting and rearing	1
No. 10 Water Unit	Storage and rearing	2
Medicine Lake	Storage	3
Homestead Lake	Nesting and rearing	1